

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 6 has been cancelled without prejudice or disclaimer.

New claims 23-26 have been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1, 2, 4, 7-17, 20, and 23-26 are now pending in this application.

Interview Summary

Applicant's representative wishes to thank the Examiner for conducting the interview of August 11, 2010. In accordance with the request in the Interview Summary dated August 12, 2010, please be advised that the Interview Summary accurately summarizes the interview.

Claim Objection

Claim 6 is objected to for containing an informality. Claim 6 has been cancelled without prejudice or disclaimer. Reconsideration and withdrawal of this objection is respectfully requested.

Rejection under 35 U.S.C. § 112

Claim 4 is rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicant respectfully submits that the amendments to the claims render this rejection moot. Reconsideration and withdrawal of this rejection is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 1, 2, 4, 6-17, 19, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,554,225 to Sounai *et al.* (hereafter “Sounai”) in view of U.S. Patent No. 6,562,507 to Cisar *et al.* (hereafter “Cisar”). This rejection is respectfully traversed.

Sounai discloses a molten carbonate fuel cell with a cathode 14, an anode 15, an electrolyte layer 13, and an interconnect 12. See Sounai at col. 4, lines 19-30. Each of the cathode 14 and anode 15 include a first porous layer 18 formed at a side of the electrolyte layer 13 and a second porous layer 19 formed at the opposite side. See Sounai at col. 4, lines 36-42, and Figure 2. Sounai discloses that the first porous layer 18 and the second porous layer 19 have a porosity of 60-80%. See Sounai at col. 4, lines 42-52.

Sounai discloses that the pore size of the first porous layer 18 is set to allow capillary action and that the pore size of the second porous layer 19 is set to not allow the capillary action, with the first porous layer 18 having a small pore size and the second porous layer 19 having a large pore size. See Sounai at col. 5, lines 25-29, 41-46, and Figure 2. Sounai discloses that the first porous layer 18 has a pore size of 0.3 to 20 μ m, while the second porous layer 19 has a pore size of 21 to 50 μ m. See Sounai at col. 4, lines 44-52.

However, the interconnect 12 of Sounai is not an impermeable metal structure configured to function as a collector layer or a bipolar plate, a first metal fiber layer having fibers with an equivalent diameter larger than 20 μ m and being sintered to a first side of said impermeable metal structure, and a second metal fiber layer having fibers with an equivalent diameter smaller than 10 μ m and being sintered to another side of said first metal fiber layer opposite to the impermeable metal structure, as recited in claim 1.

The Office argues that Sounai discloses that the second porous layer 19 can have a diameter of 25 μ m (and serves as the first metal fiber layer recited in claim 1) and the first porous layer 18 can have a diameter of 4 μ m (and serves as the second metal fiber layer recited in claim 1), citing Example 1 of Sounai in col. 6, lines 5-22, and that the interconnect 12 serves as an impermeable metal structure. However, in such an interpretation, the

interconnect is not an impermeable metal structure configured to function as a collector layer or a bipolar plate, as recited in claim 1, because the electrolyte 13 of Sounai is not configured to provide this function. However, as shown in Figures 1 and 2 of Sounai, the second porous layer 19 of Sounai is not sintered to a first side of the electrolyte 13 and the first porous layer 18 is not sintered to another side of the electrolyte 13. Thus, the order of the first and second layers 18, 19 of Sounai is opposite to the order of the stack recited in claim 1. Further, the disclosure of Sounai teaches against the arrangement recited in claim 1 by showing that the layer having fibers with a higher equivalent diameter should be positioned away from the electrolyte 13 rather than adjacent to the electrolyte 13.

The Office argues on pages 4 and 5 of the Office Action that it would have been obvious to provide the first and second porous layers 18, 19 of Sounai with porosities of greater than 80% and less than 80%, as recited in claim 1, because Sounai discloses a porosity of 60 to 80% for each layer and a *prima facie* case of obviousness exists when claimed ranges are close enough that one skilled in the art would have expected the ranges to produce the same properties, arguing that 80% is close enough to greater than 80% and citing *Titanium Metals Corp.* The Office further argues on page 5 of the Office Action that Sounai discloses that second porous layer can have a diameter of 25 μm , citing Example 1 of Sounai in col. 6, lines 5-22.

However, Sounai does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, and at least one second metal fiber layer, said first metal fiber layer having fibers with an equivalent diameter larger than 20 μm , said second metal fiber layer having fibers with an equivalent diameter smaller than 10 μm , wherein a porosity of said second metal fiber layer is less than 80%, and wherein a porosity of said first metal fiber layer is more than 80%, as recited in claim 1. Except for Example 1, Sounai is silent in regard to the porosities and the equivalent diameters of the fibers of the porous metal layers 18, 19.

In Example 1, Sounai discloses that a first porous layer includes fibrous material with a diameter of 4 μm , a pore size of 2 to 5 μm , and a porosity of 75%. Sounai discloses that the second porous layer of Example 1 includes fibrous material with a diameter of 25 μm , a pore

size of 22 to 30 μm , and a porosity of 75%. In other words, Sounai discloses that neither the first and second layer has a porosity greater than 80% or a porosity that is “close” to greater than 80%, as recited in claim 1. In fact, Sounai discloses that the first and second porous layers have the same porosity. As a result, Example 1 of Sounai cannot be relied upon to disclose or suggest the features of claim 1.

Applicant notes that Example 2 of Sounai regards a combination of a fibrous metal and a powdery metal, not two layers of fibrous metal. See Sounai at col. 7, lines 13-28. Therefore, Example 2 of Sounai is not applicable to the stack of claim 1 because Example 2 does not provide first and second metal layers.

In addition, Sounai does not disclose or suggest layers being sintered to one another, as recited in claim 1, as suggested on page 3 of the Office Action. To address this deficiency, the Office cites Cisar. Cisar discloses a barrier and flow control device for electrochemical reactors that includes a flow field 102, a thin porous gas diffusion layer 104 sintered to the flow field 102, a membrane 106, and electrodes 108, 109. See col. 9, lines 1-13, 37-47, and Figures 13 and 15 of Cisar. Cisar discloses that the flow field can have a structure of metal foam, metal grids, sintered metal particles, sintered metal fibers, and combinations thereof. See claim 2 of Cisar.

However, Cisar does not remedy the deficiencies of Sounai discussed above because Cisar also does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, and at least one second metal fiber layer, said first metal fiber layer having fibers with an equivalent diameter larger than 20 μm , said second metal fiber layer having fibers with an equivalent diameter smaller than 10 μm , wherein a porosity of said second metal fiber layer is less than 80%, and wherein a porosity of said first metal fiber layer is more than 80%, as recited in claim 1.

For at least the reasons discussed above, the combination of Sounai and Cisar does not disclose or suggest all of the features of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

New Claims

New claims 23-26 have been added. Applicant's disclosure provides support for new claims 23-26. For example, at least page 5, line 30, to page 6, line 3, and page 7, lines 4-10, of Applicant's specification provide support for new claims 23-26.

Claims 23-26 depend from claim 1 and are allowable over the prior art for at least the reasons discussed above and for their respective additional recitations. Further, in regard to claims 23-25, the combination of Sounai and Cisar does not disclose or suggest the features of these claims because Sounai only discloses a porosity of 60-80%. See Sounai at col. 4, lines 42-52. Cisar fails to remedy the deficiencies of Sounai.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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